

## DEVICE FOR ATTACHING AN ELASTIC MEMBER TO EXERCISE APPARATUS

### Background of the Invention

#### **Field of the Invention**

This invention generally relates to resistance based exercise equipment and more particularly to a spring anchor for a spring biased resistance exercise devices such as a Pilates combo chair.

#### **Description of Related Art**

Today, many types of exercise equipment are available and used for fitness and/or medical reasons to burn off undesired calories, to improve cardiovascular ability, to tone or strengthen muscles, or to improve flexibility, balance, posture, etc. No matter what the desired end goal of a user of exercise equipment may be, almost all types of exercise equipment aid the user to achieve his or her desired goal by creating some form of adequate and effective resistance against repeated bodily movements of the user.

A hook is often used to connect each of the two ends of the spring (or generally a force resisting mechanism) to a fixed location on the exercise equipment. However, a hook may easily become unattached from the exercise equipment if the spring to which the hook is connected becomes relaxed. Thus, there is a need for a device that securely connects a force resisting mechanism to an appropriate location of exercise equipment and that allows the force resisting mechanism to remain securely connected in place as the tension and stress of the force resisting mechanism is varied or modulated.

A Pilates Wunda or Combo chair is one such exercise device that is basically a box structure that has one open side out of which one or two spring biased pivot arms protrude. The box structure is designed to rest on a horizontal surface such as a floor. Each of the pivot arms has one end fastened to an inside wall of the box. The free end of the pivot arm has a foot step/support pad mounted thereon. A user typically stands on the floor and steps or presses downward on the step pad at the free end of the pivot arm with his or her foot or hand to rotate the arm downward against tension provided by one or more coil springs attached between an

anchor point on the arm and an anchor point inside the box in order to perform various exercise movements.

One end of each coil spring is attached to one of the pivot arms typically via a hook. The other end of each coil spring typically has a hook that must be inserted into the eye of an eyebolt fastened to the inside or the inner sidewall of the combo chair structure. The user must physically bend down, look under the top of the chair to align and engage the hook into the eyebolt. This action is awkward and inconvenient for the user as it is often difficult to attach the spring without visually watching connection as it is being made.

### Summary of the Invention

Against this backdrop the present invention has been designed. A preferred embodiment of the present invention is a spring anchor adapted to be fastened to a surface of an exercise apparatus such as a Pilates combo chair. In the combo chair application, the anchor in accordance with the present invention may be mounted on the pivot arm and also mounted to the inner sidewall of the box frame structure.

The anchor basically is an hourglass shaped solid body adapted to receive one end of a coil spring therearound. The solid body has a central axial bore therethrough, a maximum outer diameter, and a waist having a diameter less than the outer diameter. A flexible disc is fastened to a top portion of the body. This disc has an outer diameter greater than the outer diameter of the solid body so that the outer edge of the disc extends beyond the solid body. A threaded cap member passes through the flexible disc and through the solid body fastening the flexible disc between the top of the solid body and a cap portion of the cap member. The threaded cap member then threads into the surface of the exercise device. The spring anchor outer diameter is sized to fit within an eye at the one end of the coil spring and the flexible disc is sized larger than the eye, so that the flexible disc elastically deflects and deforms to permit the eye to pass over the disc and onto the spring anchor.

After a spring is fastened to the anchor, the flexible disc prevents inadvertent slippage of the eye of the spring off of the anchor. The spring can easily be removed from the anchor by releasing the tension on the spring and forcing the eye over the flexible disc and off the anchor body. The flexible disc acts as a retainer or guard on the anchor to prevent inadvertent dislodging of the spring from the anchor. These and other features, advantages and objects of the

invention will become more apparent from a reading of the following detailed description when taken in conjunction with the accompanying drawings.

### **Brief Description of the Drawings**

FIG. 1 is a perspective view of an exercise apparatus that incorporates an embodiment of the present invention.

FIG. 2 is a side view of an anchor in accordance with an embodiment of the present invention separate from the exercise apparatus shown in FIG. 1.

### **Detailed Description of the Invention**

One type of exercise apparatus, which utilizes an embodiment of the present invention described hereinafter, is shown in FIG. 1. The Pilates combo chair 100 may have single or split steps 102. The split steps 102 may easily be converted into a single step by inserting a dowel (not shown), horizontally through a bore 108 through each of the two aligned split steps 102. The dowel connects the split steps together forming a single step. As shown in FIG. 1, each step is at the free end of a pivot arm 104. The other end of the pivot arm 104 is connected to the base of the box shaped frame structure 106 the combo chair 100 by a self-lubricating bearing for smooth operation and rotation of the arm 104. The step 102 is padded and covered with a rubberized or other type of non-slip material that minimize accidental foot slippage by increasing the surface friction between the step and a user's foot that rests on the step 102. One or more springs 110 each have one end 112 connected to the pivot arm 104 via an anchor 120. The other end 114 of the spring 110 is fastened to a sidewall of the frame structure 106 via another anchor 120 in accordance with the present invention.

A user performs various exercises by placing one or two feet on the footrests and undergoing a series of stepping movements. The springs 110 provide a level of resistance that may be varied by changing the number of springs and/or the spring attachment location to one of the anchors 120 to which the spring or springs are attached. For example, the combo chair 100 shown in FIG. 1 has five spring attachment anchors in accordance with the present invention for each step 102. There are three anchors on the sidewall of the frame 106 of the combo chair 100 and two on the step pivot arm 104 near the step 102.

The anchor 120 is shown in a separate side view in FIG. 2. Also shown in FIG. 2 is a cross section of one of the closed hook ends of a spring that forms a ring or eye 132 that is positioned just over the anchor 120 to illustrate the relative dimensions of the ring 132 and the anchor 120. The anchor 120 has an hourglass-shaped solid body 122 preferably made of a metal such as aluminum or steel that has a central axial through bore 124. The upper portion 126 of the body 122 has an outer diameter greater than a mid waist portion 128. Thus the waist 128 has a diameter less than the maximum outer diameter of the upper portion 126. The body 122 is shaped and sized to receive one closed end 132 of a coil spring 110 therearound.

A flexible disc 130 is positioned on the top of the upper portion of the body. This disc 130 has an outer diameter greater than the maximum outer diameter of the upper portion 126 of the solid body 122. A washer 134 is positioned on top of the flexible disc 130 and a cap bolt 136 passes through the washer 134, the disc 130, and through the axial bore 124. The cap bolt 136 is then fastened to a surface such as the box frame 106 of the combo chair 100 or fastened to the pivot arm 104 as is shown in FIG. 1.

The spring anchor outer diameter is sized to fit within the ring 132 at the end of the coil spring 110. The flexible disc 130 is sized larger than the eye of the ring so that the flexible disc 130 must elastically deform or deflect to permit the ring 132 to pass over the disc 130 and onto the spring anchor body 122. The flexible disc 130 prevents inadvertent slippage of the ring 132 of the spring 110 off of the anchor 120. The flexible disc 130 is an annular disc made of an elastomeric material and is preferably made of a reinforced neoprene that is flexible yet has sufficient stiffness to preclude inadvertent dislocation of the ring 132 from the anchor 120. One such material is a neoprene laminate that has one or more reinforcing fabric layers embedded in the neoprene substrate.

The cap member that holds the washer 134, the flexible disc 130, and the anchor body 122 together is preferably a threaded bolt 136 that has a cap portion and a threaded portion that passes through the solid body 122 and through the central aperture in the flexible disc 130. This cap member may be a screw or a bolt and the cap portion preferably is a rounded head to hold the washer in place on the flexible disc 130 and together with the body 122 against the supporting surface. The washer 134 may be omitted from the anchor 120 if the flexible disc 130 has sufficient rigidity of its own accord to retain the ring 132 on the anchor 120. The washer 134 may also be omitted if the head of the bolt 136 is wide or broad enough in diameter to provide

the support of the flexible disc **130** required. Thus, an embodiment of the present invention described hereinabove provides safety, convenience, and ease of use to users of exercise equipment.

It will be clear that the present invention is well adapted to attain the ends and advantages mentioned as well as those inherent therein. While a presently preferred embodiment has been described for purposes of this disclosure, numerous changes may be made which will readily suggest themselves to those skilled in the art and which are encompassed in the spirit of the invention as set forth in the following claims.

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200